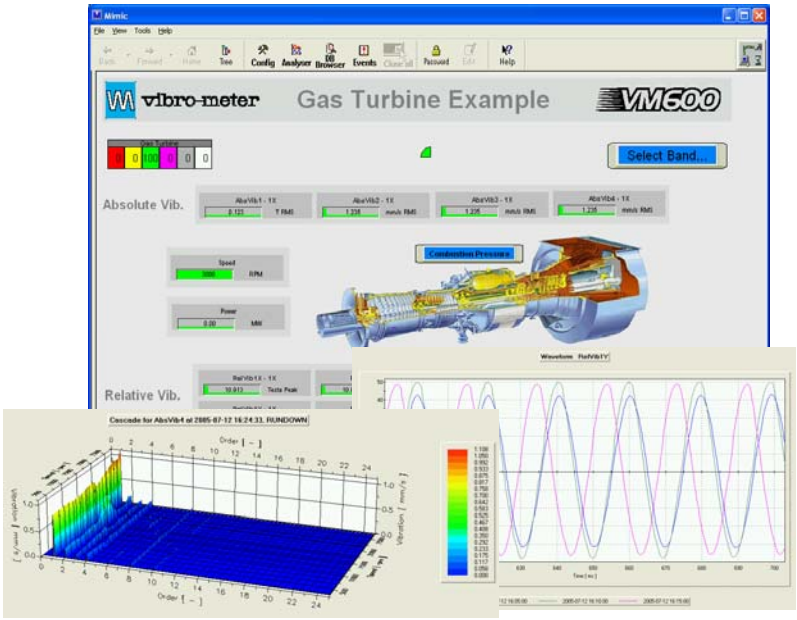
Vibro-Meter

VM600 CMS Software

VM600 Series Software for Condition Monitoring System (CMS)

FEATURES

- Configuration and operation of VM600 hardware (CMC16 and IOC16T cards)
- Automatic data acquisition and storage
- Limit exceedance checking and event logging
- Online or offline data analysis
- ANSI SQL 92 standard compatible
- Graphical User Interface
- Runs under Windows NT/2000/XP/2003 Server
- Optional Air Gap Module for hydro-turbines
- Optional Diagnostics Rule Box module



DESCRIPTION

Condition-based maintenance is a predictive methodology that can be used to improve your asset/machinery effectiveness. It enables you to:

- Improve equipment reliability through the effective prediction of equipment failures
- Minimise downtime through the planning and scheduling of overhauls
- Maximise component life by avoiding critical known conditions
- Utilise condition monitoring techniques to maximise equipment performance

Condition Monitoring Software (CMS) is based on this principle and is dedicated to the support of technicians, operators and engineers, enabling them to rapidly identify a problem, evaluate the situation and determine appropriate action to take.

CMS Software has a truly modular architecture that adapts to your specific needs. It comprises of several software modules for use with the VM600 series hardware. The steps to follow are the configuration of parameters, data acquisition and finally display the results for advanced analysis and diagnosis of your machinery.

CMS Software has the ability to automatically adapt to the criticality of the machine status by applying specific data logging scenarios. The background mode is continuous low-resolution data acquisition. The scheduled mode is pre-defined high-resolution acquisition. The transient mode is automatically detected and then transient data are acquired when the speed is out of the "steady" state. Finally, the manual mode is real-time data acquisition initiated by the user.

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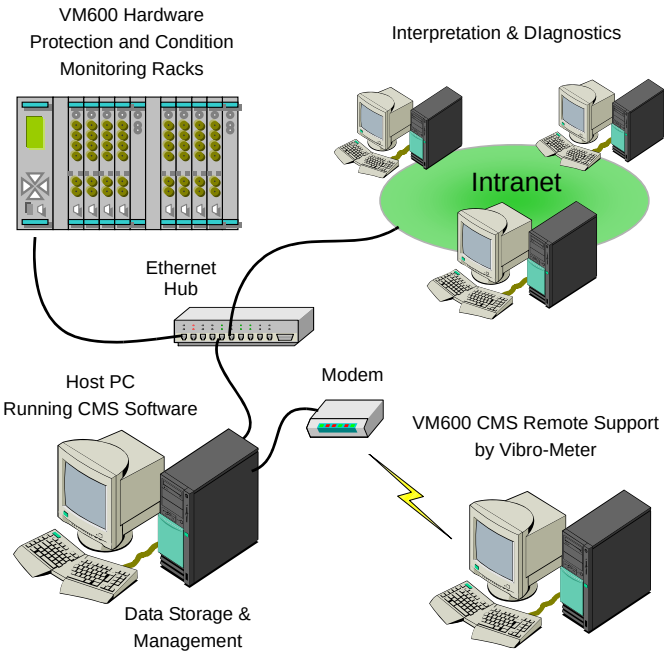
DESCRIPTION *(Continued)*

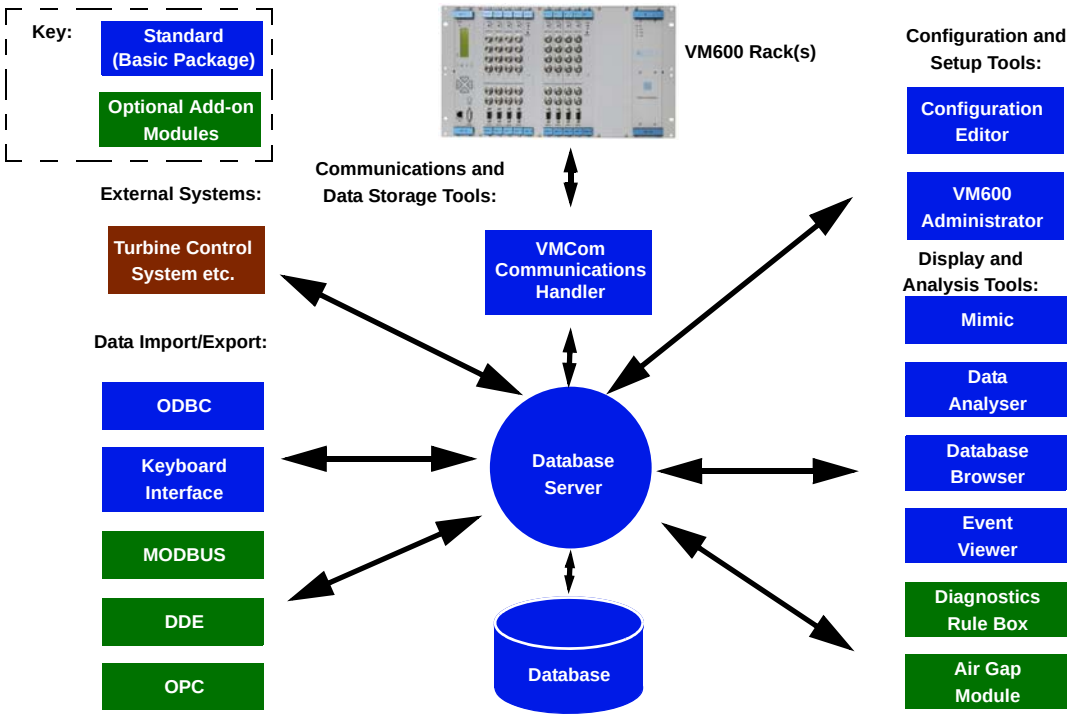


CMS Software takes advantage of the industry standard platforms to allow total adaptability of the system. It runs under Windows NT, 2000, XP or 2003 Server and has a fully graphical interface for ease of use. Moreover, the SQL-based data management server allows you to communicate with any other SQL-based database.

CMS Software can run on a single host PC or on a number of systems connected to the VM600 rack by network connections. This lets you decide whether you need to perform the entire configuration, acquisition, data analysis and troubleshooting tasks from one location or distribute them among several workstations. In a distributed configuration,all specific functions can be performed on dedicated PCs by appropriate personnel. This classification also enables remote data collection and/or analysis, and means that configuration and troubleshooting tasks can be performed via remote access if necessary.

For further applications, CMS software provides a suite of standard import/export interfaces, enabling you to transfer data to/from any third party system. Your installation benefits are thus the full flexibility and scalability of the system, because it enables the correlation of vibration data with other parameters that are already available from other devices, so there is no need to re-measure. The available interfaces are MODBUS® and OPC (Open Connectivity) for communication with field devices, PLDs (Programable Logic Devices), DCSs (Distributed Control Systems), etc. The Microsoft standard DDE (Dynamic Data Exchange) is used to exchange data between the CMS Software and external devices. Finally, the ODBC (Open Database Connectivity) allows your CMS database to import data from any ODBC database.

On top of these modules, the new Diagnostics Rule Box (DRB) enables the user to integrate his machinery knowledge within the program rules, set conditions on real-time values, create alarms and alerts, and ultimately generate automatic actions to adequately warn the user if an event occurs.



DIMENSIONS

VM600 Administrator	The VM600 Administrator program is a "portal" providing quick and convenient access to all of the CMS Software tools, as well as to a number of useful Windows system tools.
Mimic	The Mimic provides the operator with a customised, graphical view of the machinery being monitored by the CMS Software system. The types of data you can visualise directly from the Mimic are "live" data, i.e. current values and current status of both the VM600 hardware and the "offline" systems, as well as user-requested high-resolution data such as waveforms, spectra and orbit plots.
Data Analyser	The Data Analyser is used to display measurement data from the SQL database. It takes data from selected data points defined in the database, applies user- or system-defined filters to the data, and displays the data as a variety of graphs, plots and charts. Typical filters that can be applied to data are time, alarm status, machine status, or a user-configurable filter based on any speed, analog or digital data.
Database Browser	The Database Browser is used to display the content of the SQL database in graphical form. It can display stored datasets, such as events, spectra, waveforms and orbits as intuitive time-line representations, thus providing an effective overview of the measurement data that have been collected. You can then quickly navigate to the dataset of interest using a set of independent criteria (by point, type of data set, time or alarm state).
Event Viewer	The Event Viewer is used to view the events in the SQL database that may have been created automatically by the system or as defined by users. It displays the available events in list form, using colour coded, intuitive icons. The window shows either all events present in the database, or you can choose to set and activate filter criteria in order to limit the displayed events.
Configuration Editor	The Configuration Editor is used to set up the required configuration of all aparameters of the system, including the configuration details of each single output band, machine-specific parameters for data logging or transient data and complete VM600 rack configurations. It stores the system configuration inside the SQL database, from where it can be viewed or changed by users with sufficient access rights. It is also a starting point for the advanced configuration of the database, such as preparing the database to accept "offline" data imported from external systems.
VMCom	The VMCom program handles the flow of data between VM600 racks and SQL databases. It communicates with the CMS hardware and the SQL database. This program can either be launched manually or configured as a system service; for this purpose a special service setup utility is included that allows you to configure, create or delete a Windows system service. This is the preferred way of communicating with VM600 hardware for permanent system installations and dedicated on-line condition monitoring applications.

Table 1: CMS Software Application Modules (Sheet 1 of 2)

DIMENSIONS *(Continued)*

Diagnostics Rule Box (optional)	The optional Diagnostics Rule Box is a powerful, fully automated, decision support system for operators and machinery experts. Any information in a SQL database, including measurement data and imported "offline" data, can be used to generate complex diagnostics rules. You can also develop templates for standard diagnostics procedures and activate them for any item of machinery. This tool is based on the concept of fully customisable rules and scripts: • *Rules are composed of three elements:* - Input Level: Any number of customisable input criteria, such as exceedance checks, points' status and counters, which are associated with either individual measurement points or groups of measurement points. - Logical Level: A freely-configurable assembly of logical combinations of Input Level elements. - Action Level: Any number of user-defined actions that are executed based upon results from the Logical Level. • *Scripts are assemblies of rules that are ready to be executed according to user-defined parameters. Scripts can contain sequences, loops and branches, and allow you to customise their execution according to the particular needs of the diagnostics rules.* • *These three elements are interconnected using a user-friendly and intuitive graphical editor. Simulation tools are provided to allow easy visual verification and testing of the rules, using simple colour-coding techniques.* Diagnostics rules are easy to adapt and enhance without affecting normal system operation. The Diagnostics Server subsequently runs independently and performs the tasks defined in the Diagnostics Rule Box, working in parallel with the normal data acquisition tasks of the system.
Air Gap Module (optional)	The optional Air Gap Module (based on using VM600 CMS Hardware in a special configuration with post-processing) allows you to monitor the gap between the rotor and stator in large hydro-generator groups, thereby avoiding potentially destructive and costly failures of machinery. The main functions of this module are to: • *Allow the long-term monitoring of the rotor/stator air-gap* • *Measure rotor profile in one or more layers* • *Generate alarms and alerts for each sensor installed on the machine* • *Continue to process and interpret data in the event of one or more sensors becoming non-operational* • *Detect critical deformation of the rotor* • *Perform long-term trend measurements* • *Calculate the basic values that characterise the position and shape of the rotor and stator* The Air Gap Module can produce a variety of dedicated graphs, in addition to those produced by the standard VM600 CMS Software (see Table 3).

Table 1: CMS Software Application Modules (Sheet 2 of 2)

DIMENSIONS *(Continued)*

With its optional add-on set of open-standard data interfaces, the CMS Software is capable of processing "offline data", i.e. data that are not originally acquired using a VM600 Hardware but from other third party systems like field devices, PLD's, DCS, etc.

The following data protocols are supported:

Keyboard	The Keyboard interface allows you to manually set the values of "offline" data points by entering their values using a keyboard.
ODBC	The ODBC interface is a module for importing data from databases supporting the ODBC standard. It enables data from ODBC data sources to be imported into the SQL database. To export data from the SQL database, no special interface is required, since the SQL database is already ODBC compliant.
DDE (optional)	The DDE interface allows the exchange of data between the CMS Software and external devices that support the Dynamic Data Exchange (DDE) interface, a Microsoft standard for data exchange between software applications. The DDE interface tool allows data to be imported from external DDE data sources into the SQL database, and online values (current values and their current status) to be exported from the SQL database to external devices. The DDE interface can act as client and/or server, depending on the configuration.
MODBUS (optional)	The MODBUS interface, a Modicon standard protocol for data exchange between software applications, allows data to be exchanged between the CMS Software system and external devices that support the MODBUS interface. Both MODBUS RTU (for serial line connections) and MODBUS TCP (for Ethernet connections) are supported. The MODBUS interface tool imports data from MODBUS data sources directly into the CMS database and exports online values (current values and current status) from the CMS database to external devices. The MODBUS interface can act as client and/or server, depending on the configuration.
OPC (optional)	The OPC interface allows the exchange of data between the CMS Software and external devices that support the Open Connectivity (OPC) interface, a Microsoft standard for exchange between software applications. The OPC interface tool allows data to be imported into the SQL database, and online values (current values and their current status) to be exported from the SQL database to external devices. The OPC interface can act as client and/or server, depending on the configuration.

Table 2: CMS Software Interfaces

DIMENSIONS *(Continued)*

Different plots are available depending on the mode of acquisition (historic, transient or real-time).

Historic Plots[a]	Transient Plots[a]	Real-time Plots
• Waveform	• Trend	• Bar graph
• Spectrum	• Cascade	• Trend
• Orbit	• Shaft Centerline	• Waveform
• Shaft Centerline	• Bode	• Spectrum
• Trend	• Polar	• Orbit
• Average Trend	• Multi-Polar	• Polar
• Polar		• Long Waveform
• Waterfall		
• Correlation Plot		
• Long Waveform		
• Rotor Shape Plot[b]		
• Rotor Signature Plot[b]		
• Rotor Polar Plot[b]		
• Pole Trend Plot[b]		

Table 3: CMS Software Display Plots

a stored in the database
b available with the Air Gap Module

HARDWARE REQUIREMENTS

Minimum Computer Configuration

- *233 MHz Pentium*
- *128 MB RAM*
- *1 GB hard disk*
- *CD-ROM drive*
- *VGA monitor*
- *Any Windows-compatible pointing device*
- *Standard Ethernet card (TCP/IP)*

Recommended Computer Configuration

- *1.2 GHz Pentium III*
- *512 MB RAM*
- *10 GB hard disk*
- *CD-ROM drive*
- *17” SVGA compatible (19” is preferable)*
- *2-button mouse*
- *High-speed Ethernet card (TCP/IP)*
- *20/40 GB DAT backup tape drive, or larger (optional)*

ORDERING INFORMATION

To order please specify:

Type	Designation	Ordering Number
CMS	Condition Monitoring Software for VM600 series	209-500-600-SSs

Note: "SSs" represents the software version.
Specify your order options using the format 209-500-600-SSs/Code 1/Code 2/Code 3/Code 4/Code 5/Code 6/Code 7/Code 8, as follows:

CODE NO.	FEATURE	VALUE	DESCRIPTION
Code 1	Language	01	English
Code 2	Hard copies of user manual	00	None
		01	1 set
		0x	x = number of sets
Code 3	System size	00	Undetermined
		01	1 user (single host)
		02	5 concurrent users + server
		03	15 concurrent users + server
Code 4	DB synchronisation	00	None
Code 5	DB server web-enabled	00	None
Code 6	Performance monitoring plug-in	00	None
Code 7	Data exchange interfaces	00	None
		01	Data import and export for DDE (Server and Client)
		02	Data import and export for MODBUS (Server and Client)
		03	Data export for OPC (Server)
		04	Data import for OPC (Client)
		05	Data import and export for OPC (Server and Client)
Code 8	Advanced post-processing	00	None
		02	Basic Air Gap Module
		04	Diagnostics Rule Box

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Sales offices

Vibro-Meter has offices in more than 30 countries. For a complete list, please visit our website.

Your local agent

Head office

Vibro-Meter SA
Rte de Moncor 4
P.O. Box
CH-1701 Fribourg
Switzerland

Tel: +41 26 407 11 11
Fax: +41 26 407 13 01

www.vibro-meter.com

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